

Article

# Czech and Slovak members of religious institutes their health in comparison to general population

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**Abstract:** The study examines the general health of consecrated persons (CP) in the Czech Republic (CZ) and in Slovakia (SK) compared to control samples of Czech population. Compared to the previous studies from some western countries, we expected a higher level of adverse health affecting factors among CP in post-communist CZ and SK. The sample of 293 CP participants (age: M = 47.52, SD = 9.57, females: 78.88%, 180 Czechs, 213 Slovaks) was compared with two control samples, one was nationally representative. Comparing CP with general population, we measured the frequency of recent health complains, the occurrence of chronic illnesses, the general health and the individual chronotype. CP compared to the representative sample had a higher chance of suffering from small pelvis pain and obesity, but a lower chance of diabetes. Further, CP had higher odds of having worse general health. Comparing “larks” with “night owls” among CP, “night owls” had a significantly higher chance of suffering from worse general health. “Night owl CP” also seem to suffer more from backache and depression/anxiety and to have more problems with falling asleep. Compared to the major society, CP in CZ and SK tend to have a similar or a slightly worse general health. The results differ from the US findings pointing at the positive health effects of spiritual experience and structured daily routine of CP. Thus, this study shows the importance of more detailed research on the way of life of Czech and Slovak CP to determine the factors with the most negative health effects.

**Keywords:** spirituality; consecrated person; health; religious institutes; Czech; Slovak

## 1. Introduction

Persons who consecrated themselves through their lifelong commitment to God and to a certain religious institute represent a minority group belonging mostly to the Roman Catholic Church [1,2]. This group differs from the major society in more aspects and its way of life arouses many questions [3,4]. To the main specifics of living in a religious institute belong the fundamental role of spirituality [5] and religiosity [6], the hierarchical structured community and subordination to the authority, the binding statutes and daily routine [7,8], gender uniformity and resignation on sexual relationships and family life [9]. Expected is also a high level of social engagement [10] as well as a certain social isolation and/or self-excluding from the mainstream [11,12]. Catholic order members can be regarded as a homogenous population with a number of common characteristics on individual and socioeconomic level [13].

Research on health among consecrated people (CP) attracts some attention, but the studies are sparse and rather ambiguous. The majority of the existing studies brings positive conclusions. The religious order members were reported to be at lower risk of mental health disorders [14], more successful in achieving physical and mental well-being [15] and able to care systematically for their health [16].

The prevalence of positive emotions was observed among the nuns [17] as well as a higher level of personal happiness [18] and satisfaction at work engagement [19] together with lower tendency to professional burnout [20]. Several studies chose the religious communities as a sample of people living a meaningful and cognitive stimulating life and came to the results of lower risk of Alzheimer disease or dementia among them [21,22]. It corresponds to the findings about higher ability of consecrated persons to age meaningfully [23] and about their longevity [24,25]. On the contrary, a few studies point at some deficits in the health practises of religious order members [26]. These deficits can include a danger of exhausting the spiritual resources through excessive work engagement [10] or an impact of community conflicts on the health of individuals [13]. Furthermore, because the daily routine of the religious communities is usually strongly oriented to getting up early and going to bed early without considering individual chronotype, we also suppose persons with a late circadian timing, the so called “night owls”, being in some measure handicapped by this regime. As opposite to the “larks” with an early circadian timing, “night owls” prefer to stay up and to work long in the evening and have problems to wake up and to be active early in the morning [27]. “Night owls” living in a religious community with a structured daily routine might suffer from lack of sleep, which might have a negative impact on their health [28]. However, the existing results cannot be fully generalized, because there is a need of more data from different countries and social-political contexts. So far, most of the previous research studies were carried out in the USA, some of them in Poland, Germany and Italy. In all these countries, in spite of the advanced secularisation in some of them, the presence and the social engagement of religious institutes have an established tradition and a high level of public credit, which seems to play an important role [14]. On the contrary, data from secular post-communist countries are missing, as well as data from African, Asian or South American communities. We presume there is also some other bias to consider, such as a high level of social desirability and non-representative samples because all community members rarely complete the voluntary questionnaires and the healthier and more active persons are more likely to participate. The current study examines the general health characteristics of religious brothers and sisters in former Czechoslovakia compared to control samples of the Czech population. As the country with the highest percentage (76,4%) of religiously unaffiliated people in the world (Pew Research Center 2014), the Czech Republic (CZ) represents a not very supportive milieu towards the Roman Catholic Church and religious institutes. Slovakia (SK) belongs traditionally to the Catholic countries (62% Roman Catholics and 13,4% atheists in the 2011 census) and the consecrated persons are more numerous and more appreciated than in the Czech Republic. Nevertheless, the modern history of these two countries is firmly connected and the convents and monasteries in both of them are still carrying the consequences of the long persecution, overworking and forced isolation during the communist regime. Compared to the previous studies, given these facts, we may expect a higher level of adverse health affecting factors and lower scores of well-being and life satisfaction among the members of the Czech and Slovak religious communities, presuming some slight differences between the Czechs and Slovaks. Therefore, the aim of this study is to explore the possible associations between membership in a convent or monastery religious community in two post-communist countries and the general health characteristics of the individuals. Further, we will assess if the individual chronotype can play some role in health of consecrated persons.

## 2. Methods

### 2.1. Measures

#### 2.1.1. Health complaints

The frequency of recent health complaints was assessed by the 6-item measure: headache, stomachache, backache, intestinal problems, trouble falling asleep, dizziness. The question was: “In the past month, how often have you had the following issues?” Each item was answered on a five-point scale: never (1), about once or twice (2), approximately once a week (3), more than once a

week (4), every day (5). For analytical purposes, participants responses were dichotomised. Answers ranging from 1: “never” up to 3: “approximately once a week” were recoded as “Not many times per week” and answers ranging from 4: “More than once a week” up to 5: “every day” were recoded as “Many times a week”.

### 2.1.2. Long lasting illnesses

For the occurrence of chronic illnesses, an 18-item measure was used introduced by the question: “Do you have a long-term illness or disability? Please tick all that apply to you.” The illnesses are listed in Table 2.

### 2.1.3. General health

The general health was assessed by composite variable created by summing up the number of chronic illnesses. This variable was consequently divided into several categories based on the following approach: having < 1 disease was classified as “no diseases”, 1-2 diseases was classified as “few diseases” 3-5 diseases as “several diseases” and more than 6 as “many diseases”.

### 2.1.4. Chronotype

The daily energy was measured by choosing between two possibilities – “an early bird” (or “lark”) who wakes up early but is tired in the evening, or “a night owl” who has problem with waking up early but enjoys working in the evening.

## 2.2. Participants

### 2.2.1. Sample one

First sample ( $n = 1800$ , Age:  $M = 46.41$ ,  $SD = 17.4$ , Females: 51.28%) consisted of participants from Czech nationally representative sample of the study on health, life experience, attitudes and lifestyle collected in 2016 [29]. In this dataset we did not find subjects responding incongruently to the control items i.e. feeling the God presence despite being non-religious or atheist. Thus, no participant was excluded from the dataset.

### 2.2.2. Sample two

The second sample was collected in April 2020. It was a survey made in the Czech population during the first Covid 19-lockdown. From the original dataset ( $n = 1263$ ), we excluded 120 participants who responded incongruently to 3 repeatedly asked questions and those, who were speeders i.e. time spent on filling the questionnaire was < 10 min. The three control questions included age (difference > 2 years), weight and height (difference > 2 kilogram and centimetres). Hence, the number of participants was 1143. Based on the results of outliers screening procedure (see statistical analysis section), we also removed subjects, which responded to large number of questions in the same way ( $n = 2$ ). Therefore, the final number of participants was 1141 (Age:  $M = 49.2$ ,  $SD = 16.73$ , Females: 46.45%).

### 2.2.3. Sample three

A sample of Catholic order members in the Czech Republic and in the Slovak Republic was recruited to take part in a survey regarding various aspects of today's consecrated life. The respondents were recruited by contacting the major superiors of all male and female religious institutes in both countries. After six weeks, the information about the survey was sent directly into the local communities in order to increase the number of respondents. The research was done under the auspices of the Conference of Major Religious Superiors of the Czech and Slovak Republic. The superiors were asked to spread an online or a paper-and-pencil questionnaire among the members of their communities and to support its completing. Data was collected from March to May 2021.

This sample initially consisted of 497 participants. In the first step, we excluded participants ( $n = 4$ ) who were classified as speeders i.e. finished questionnaire typically lasting more than 30 minutes in  $< 10$  minutes. After this exclusion, 493 participants remained. We also removed participants who filled questionnaire multiple times ( $n = 63$ ) resulting in ( $n = 430$ ) of subjects. This sample consisted of 180 Czech participants and 213 Slovak participants. Other than Czech and Slovak participants were excluded ( $n = 37$ ) resulting in 393 subjects (Age:  $M = 47.52$ ,  $SD = 9.57$ , Females: 78.88%). No uniform pattern of responding was detected in this sample. The mean duration of being part of a religious community was 24.45.

### 2.3. Statistical analysis

As suggested by Shapiro-Wilk test and by histograms, normality assumption was broken in all samples. Thus, non - parametric methods were used. Homogeneity of variances was equal in all samples as indicated by the Breusch-Pagan test. As the null hypotheses of the MCAR test in all our surveys was not rejected, we deleted missing values listwise. Outliers were explored by the Median Absolute Deviation (MAD). Outliers identified by the MAD were consequently screened and if there were signs of uniform pattern of responding, i.e. answering the number of items in the same manner, outliers were removed from the dataset.

To explore the differences in health status among CP and non-CP, we compared long lasting illnesses of CP to chronic illnesses of participants from representative sample in logistic regression models. In these models, long lasting illnesses were set as dependent variables. Grouping variable distinguishing CP from non-CP was a regressor. Covariates consisted of gender, education and age. Ordinal logistic regression was used to compare CP and non-CP in the general health. The same regression type was applied to explore associations between the chronotype and general health in CP. In the ordinal regression models, the following variables were controlled: age, education, gender and length of life in a religious institute. The Brant test indicated, that proportional odds assumption held for each of the ordinal regression models. Variance inflation factor (VIF) was used to assess multicollinearity in all regression models. The VIF values  $< 10$  indicated an acceptable degree of association between variables [30]. Bonferroni correction was used to correct p-values in all regression models. When the significance was lost after correction, we used the term “trends” to describe relationships after the correction. The R [Version 4.0.5; R Core Team [31]] was utilized for all analysis.

## 3. Results

The table 1 depicts the basic socio-demographic characteristics of the study samples.

**Table 1.** Socio-demographic table

Characteristic	Sample 1 N = 1,800	Sample 2 N = 1,141	Sample 3 (CZ,SK) N = 393
Gender			
Female	923 (51%)	530 (50%)	310 (79%)
Male	877 (49%)	523 (50%)	83 (21%)
Family_status			
Not in relationship	439 (24%)	267 (25%)	
Married	929 (52%)	461 (44%)	
Divorced	158 (8.8%)	201 (19%)	
Widow/Widower	133 (7.4%)	73 (6.9%)	
In relationship	141 (7.8%)	51 (4.8%)	
Education			
Basic school	141 (7.8%)	90 (8.7%)	1 (0.3%)
Vocational school or non - maturity high school	442 (25%)	400 (39%)	12 (3.1%)
High school	854 (47%)	377 (36%)	48 (12%)
Higher vocational school or University	363 (20%)	169 (16%)	332 (84%)
Economical_status			
Without work	261 (14%)	149 (14%)	
Pensioner	430 (24%)	325 (31%)	
Working	1,109 (62%)	559 (54%)	
Faith			
Yes, I am a member of church	170 (9.4%)		
Yes, but I am not a member of a church	361 (20%)		
No	1,004 (56%)		
No, I am convinced atheist	265 (15%)		

### 3.1. Chronic illness differences

In Table 2, prevalence of chronic diseases among the study samples can be found. Table 3 presents differences in chronic diseases between consecrated persons and the representative sample. It was revealed that there is a significant positive relationship between being a consecrated person and a lower probability of suffering from diabetes in crude effect. However, there was a positive relationship between being a consecrated person and a higher chance of obesity in crude and ad-justed effect, pain in the small pelvis in both crude and adjusted effect and thyroid disease in crude and adjusted effect. After Bonferroni correction, thyroid disease was non-significant.

**Table 2.** General health and chronic illnesses among study samples

Characteristic	Sample 1, N = 1,800	Sample 2, N = 1,141	Sample 3, N = 393
ICHS	68 (3.8%)	47 (4.8%)	10 (2.9%)
Chronic lung disease	24 (1.3%)	36 (3.7%)	7 (2.1%)
Astma	166 (9.2%)	94 (9.6%)	32 (9.4%)
Diabetes	182 (10%)	117 (12%)	12 (3.5%)
Arthritis	121 (6.7%)	102 (10%)	29 (8.6%)
Back pain	631 (35%)	348 (35%)	131 (39%)
Allergy	364 (20%)	178 (18%)	83 (24%)
Depression/Anxiety	125 (6.9%)	102 (10%)	40 (12%)
Obesity	183 (10%)	218 (22%)	56 (17%)
Gastric or duodenal ulcers	56 (3.1%)	31 (3.2%)	12 (3.5%)
Thyroid disease	152 (8.4%)	110 (11%)	46 (14%)
Hypertension	371 (21%)	243 (25%)	69 (20%)
Migraine	223 (12%)	94 (9.6%)	42 (12%)
Skin diseases eczema	156 (8.7%)	102 (10%)	38 (11%)
Stroke	20 (1.1%)	20 (2.0%)	3 (0.9%)
Pain in the small pelvis	68 (3.8%)	35 (3.6%)	37 (11%)
Pain of unclear origin	99 (5.5%)	65 (6.6%)	14 (4.1%)
Cancer	36 (2.0%)	28 (2.9%)	9 (2.7%)
General_health	1.69 (1.54)	2.01 (1.93)	1.98 (1.71)

<sup>1</sup> ICHS = Ischemic heart disease, In the General health variable, values refers to M(SD)

**Table 3.** Depicts associations (in Odds ratios) between living in clerical life and chronic diseases (Sample 1 and 3)

	Pain in the small pelvis	Obesity	Diabetes	Arthritis	Thyroid disease
Crude effect	3.12*** (2.04, 4.72)	1.75*** (1.25, 2.41)	0.33*** (0.17, 0.57)	1.30 (0.84, 1.95)	1.70** (1.19, 2.40)
Adjusted effect	2.11** (1.23, 3.62)	1.86** (1.23, 2.82)	0.51 (0.25, 0.98)	2.12* (1.19, 3.79)	1.56 (0.99, 2.43)
	Depression/Anxiety	Migraine	Pain of unclear origin	Cancer	
Crude effect	1.79** (1.22, 2.59)	1.00 (0.70, 1.41)	0.74 (0.40, 1.27)	1.34 (0.60, 2.68)	
Adjusted effect	1.53 (0.95, 2.45)	0.75 (0.49, 1.13)	0.76 (0.38, 1.45)	2.02 (0.74, 5.35)	
	Hypertension	Ischemic heart disease	Stroke	Back pain	
Crude effect	0.98 (0.73, 1.31)	0.77 (0.37, 1.45)	0.79 (0.19, 2.33)	1.17 (0.92, 1.48)	
Adjusted effect	1.36 (0.94, 1.98)	3.21* (1.23, 8.04)	2.67 (0.47, 13.6)	1.23 (0.92, 1.65)	
	Gastric or duodenal ulcers	Chronic lung disease	Skin diseases eczema	Allergy	
Crude effect	1.14 (0.58, 2.08)	1.56 (0.62, 3.47)	1.33 (0.90, 1.92)	1.28 (0.97, 1.67)	
Adjusted effect	1.29 (0.57, 2.82)	1.49 (0.49, 4.28)	1.29 (0.81, 2.04)	1.21 (0.87, 1.67)	

Note: p < 0.05 \*, p < 0.01 \*\*, p < 0.001 \*\*\*, Adjusted effect was calculated using the following variables as a covariates: Age, Gender and Education. Values in brackets indicates 95% confidence interval. After Bonferroni correction, the first three results in the first row remained significant. Other relationships were non-significant.

### 3.2. Health complains

Table 4 refers to associations between health complains in CP as compared to sample 2. Logistic regression indicated a significant relationship between CP and sleep problems: in crude effect, CP had a lower odds of having trouble falling asleep. No further significant associations were found.

**Table 4.** Depicts associations (in Odds ratios) between living in clerical life and health complains in the last month (Sample 2 and 3)

	Trouble falling asleep	Headache	Stomachache
Crude effect	0.65* (0.45, 0.92)	0.87 (0.54, 1.36)	0.68 (0.33, 1.28)
Adjusted effect	0.84 (0.52, 1.34)	0.99 (0.53, 1.83)	0.61 (0.25, 1.43)
	Backache	Intestinal problems	Dizziness
Crude effect	0.99 (0.74, 1.31)	1.31 (0.78, 2.16)	0.85 (0.41, 1.64)
Adjusted effect	1.00 (0.67, 1.48)	1.37 (0.67, 2.81)	1.41 (0.53, 3.60)

*Note:*  $p < 0.05$  \*,  $p < 0.01$  \*\*,  $p < 0.001$  \*\*\*, Adjusted effect was calculated using the following variables as a covariates: Age, Gender and Education. Values in brackets indicates 95% confidence interval.

### 3.3. General health

Ordinal logistic regression revealed that CP being night owls had significantly higher chance of lower general health as compared to early birds - in crude effect (OR 1.53; 95% CI (1.02, 2.30);  $p=0.039$ ). In the adjusted effect however, this result was non - significant (OR 1.45; 95% CI (0.96, 2.21);  $p=0.078$ ).

In the next step, we compared CP with the representative sample in the general health. It was found that CP had significantly higher odds of having lower general health in crude effect (OR 1.36; 95% CI (1.09, 1.69);  $p=0.007$ ). Moreover, in the adjusted effect, the odds of having lower general health slightly increased (OR 1.32; 95% CI (1.01, 1.72);  $p=0.042$ ).

### 3.4. Chronotype and health complains

Table 5 shows the associations between early birds and night owls in health complains in CP sample. The following trends were found after Bonferroni correction: night owls had higher probability of suffering from problems of falling asleep and backache as compared to early birds (in both crude and adjusted effect).

**Table 5.** Depicts associations (in Odds ratios) between early bird and night owns and health complains (Sample 3)

	Headache	Stomachache	Backache
Crude effect	0.76 (0.32, 1.70)	0.70 (0.18, 2.37)	1.73* (1.05, 2.86)
Adjusted effect	0.72 (0.31, 1.36)	0.70 (0.18, 2.42)	1.74* (1.04, 2.92)
	Intestinal problems	Trouble falling asleep	Dizziness
Crude effect	1.67 (0.71, 4.02)	2.55** (1.34, 4.99)	1.51 (0.45, 5.33)
Adjusted effect	1.60 (0.68, 3.91)	2.59** (1.35, 5.11)	1.44 (0.42, 5.12)

*Note:*  $p < 0.05$  \*,  $p < 0.01$  \*\*,  $p < 0.001$  \*\*\*, Adjusted effect was calculated using the following variables as a covariates: Age, Gender, Education and yeas being in clerical order. Values in brackets indicates 95% confidence interval. After Bonferroni correction all results were non - significant.

### 3.5. Chronotype and chronic illness

Table 6 represents the results of the logistic regression comparing night owl CP to early bird CP. Although after Bonferroni correction all results were non-significant, several trends might be observed: night owls as compared to early birds had higher odds of developing chronic arthritis (adjusted effect) and anxiety/depression (crude and adjusted effect).

**Table 6.** Depicts associations (in Odds ratios) between early bird and night owls clerics and chronic mental and physical diseases (Sample 3)

	Gastric or duodenal ulcers	Chronic lung disease	Skin diseases eczema	Allergy	Migraine
Crude effect	2.23 (0.66, 8.64)	1.67 (0.36, 8.60)	1.27 (0.65, 2.52)	0.93 (0.56, 1.54)	1.15 (0.60, 2.20)
Adjusted effect	2.12 (0.63, 8.27)	1.66 (0.36, 8.55)	1.28 (0.64, 2.55)	0.94 (0.57, 1.57)	1.04 (0.53, 2.01)
	Depression/Anxiety	Ischemic heart disease	Obesity	Back pain	
Crude effect	2.02* (1.04, 4.03)	0.82 (0.21, 2.93)	1.41 (0.79, 2.52)	1.02 (0.66, 1.59)	
Adjusted effect	2.00* (1.03, 4.01)	0.54 (0.11, 2.30)	1.47 (0.81, 2.67)	1.01 (0.64, 1.60)	
	Hypertension	Diabetes	Arthritis	Asthma	
Crude effect	1.26 (0.74, 2.15)	0.88 (0.26, 2.82)	2.55* (1.17, 5.89)	1.93 (0.93, 4.14)	
Adjusted effect	1.25 (0.71, 2.18)	0.86 (0.25, 2.78)	3.49** (1.43, 9.31)	1.89 (0.90, 4.08)	
	Pain of unclear origin	Pain in the small pelvis	Cancer	Thyroid disease	
Crude effect	0.32 (0.07, 1.06)	0.64 (0.31, 1.29)	0.35 (0.05, 1.46)	1.16 (0.62, 2.17)	
Adjusted effect	0.36 (0.08, 1.21)	0.63 (0.29, 1.30)	0.29 (0.04, 1.34)	1.03 (0.54, 1.95)	

Note:  $p < 0.05$  \*,  $p < 0.01$  \*\*,  $p < 0.001$  \*\*\*, Adjusted effect was calculated using the following variables as a covariates: Age, Gender, Education and number of years being part of the clerical order. Values in brackets indicates 95% confidence interval. After Bonferroni correction all results were non-significant. Variable stroke was excluded from analysis, because regression model containing this variable not converge.

## 4. Discussion

The aim of the study was to assess the relation between living as a consecrated person in religious institutes in the Czech Republic and in the Slovak Republic and general health. Compared to a Czech national representative sample, the results showed a lower probability of suffering from diabetes in CP. However, CP were found to be in a higher risk of obesity and pain in the small pelvis (women CPs) and they seem to tend more to thyroid disease. Further, we discovered no significant results in health complaints of CP in comparison with the control sample. Only the item “trouble falling asleep” in the religious sample was close to the significance threshold. Moreover, CP had significantly more chronic diseases. More specifically, when focusing only on CP, we found a higher risk of suffering from chronic illnesses for “night owls” compared to “larks”, though only in crude effect. “Night owl CP” seem to suffer more from arthritis, backache and depression/anxiety and have more problems with falling asleep. The association of being a consecrated person with higher risk of obesity (table 2) can be explained by several reasons. According to some findings, higher tendency to obesity is observed among believers in general [32]. Further, although there are no specialised studies in this social group, some general findings can be applied considering the reality of religious communities. Regarding the high-performance orientation, enrooted for many decades particularly in apostolic religious congregations [33], we can suppose the lack of sport and physical exercise as well as the lack of sleep, which is often connected with unhealthy eating habits [34]. Furthermore, some religious communities still tend to follow the old uniforming rules which do not support individual diets [35]. In this case, all members are supposed to eat the same food, which may not be appropriate for everybody. The performance pressure is also related with higher level of stress as another factor leading to unregulated eating [36,37] and potentially elevated levels of cortisol, which is further influencing one’s metabolism [38]. The high-performance orientation and stress can also contribute to the higher tendency of CP to suffer from thyroid disease, because chronic stress seems to be one of the important factors leading to this illness, as reported by Cremaschi et al. [39]. On the contrary, though a higher risk of diabetes could be expected among CP due to the already described higher risk of obesity, which belongs to the main risk factors of diabetes [40], our results did not support this presumption. These findings may be explained by the fact that another factor significantly contributing to the development of diabetes is smoking [40], which is, however, quite rare among CP. Women CPs are non-smokers



[41] and there is only a small group of smokers among priest and men CPs [42]. However, more data would be needed to support this potential explanation. Moreover, we found two or three times higher risk of the small pelvis pain among religious sisters. There might be several reasons for this. Life in celibacy includes a higher risk of psychosomatic complaints caused by libido-suppression and of psychosexual problems [43]. Further, we can argue that issues regarding sexuality are in some extent still taboo in religious institutes, because this approach is deeply enrooted in the mentality of elderly sisters, which also tends to self-denial and ignoring of health problems [33]. Therefore, it may be challenging for some consecrated women to visit gynaecologist regularly and to solve the starting complaints soon enough. According to the latest findings of Nygaard et al. [44], in case of chronic pelvic pains, early intervention is important to reduce the complaints successfully. It remains a task for the future research to study the extent of traumatic experiences with sexual abuse among CP compared with a sample of non-CPs, because it might be another possible reason for the chronic small pelvis pain in CP [45]. Our finding of a lower general tendency of CP to have sleep disturbance remained close to significance threshold and more data would be needed to confirm it. However, religious community members with “night owl” chronotype reported sleep disturbances significantly more often than “lark CP”. Looking only at the religious sample, “night owls” declared evidently higher probability to have troubles falling asleep than “larks”. A common daily routine in a religious community is strictly oriented to getting up early and going to bed early, which is favourable for “larks” and inconvenient for “owls”, who have to adapt to this routine. In some extent, it may be useful for them, because shifting sleep/wake timings in “night owls” to earlier hours showed positive effects on their performance and mental health, as reported by Facer-Childs [27]. However, the biorhythm still might cause difficulties to fall asleep early. As a consequence, some “owl-brothers/owl sisters” seem to give up going to bed early and to continue working late in the evening according to their chronotype, but they have to respect the regime given and get up early to attend the community morning prayer. It may result in the chronic lack of sleep in this group of consecrated persons, possibly leading to other health issues. Several studies exploring the individual chronotype concluded, that the definite evening types – “night owls” show higher rates of metabolic dysfunction and cardiovascular disease and are in higher mortality risk [46]. Our sample is too small to discuss this topic, however, it showed some results about evening types having worse health characteristics. The revealed connection between being a “night owl CP” and a higher risk of depression is consistent with the general findings about this chronotype [27]. Furthermore, these CP may be stressed by the permanent lack of sleep, which can contribute to a development of depression. The higher backache tendency in “night owl CP” may be a psychosomatic consequence of a higher stress level [47]. A higher risk of arthritis in “night owl CP” does not correspond with the previous findings of Habers et al. about rheumatoid arthritis patients showing an earlier circadian rhythm [48]. However, our sample is not large enough and we would need more data to check up this potential association. When comparing Czech and Slovak CP with the Czech representative sample regarding the general health, we found significantly higher risk of having worse general health for CP. Moreover, these findings are supported by a trend, however insignificant, that could be observable in most of the chronic diseases in our study. These findings correspond to our hypothesis that comparing to the results from USA [22,24], there are more negative health-affecting factors in CP in CZ and SK. It seems to be connected with different mentality and lifestyle of CP in the USA and in CZ/SK, influenced by the major society and the historical, cultural and ecclesiastical background, especially with delayed and just partial reception of postconciliar changes after Vaticanum II, which is typical for the post-communist countries [49,50]. The Czech/Slovak CP still seem to tend to the traditional performance-oriented lifestyle characterised by strict self-denial [51]. Thus, possibly reasons for the worse general health in Czech/Slovak CP could be overworking, stress and lack of active and passive rest caused by the stereotyped regime of the communities, unadapted to their actual situation and not giving enough space for leisure and relaxation of individuals. Perhaps also higher incidence of psychosomatic problems could be considered. All these are hypotheses for future research. Strengths and limitations This study has several important strengths, the most important is

that it is the first study about consecrated persons living in the specific milieu of two post-communist countries. The study is based on the first blanket research among CP in these countries, which is covering many dimensions of consecrated life and allows to investigate various factors of living in a religious community. Moreover, as a comparison, this research uses a large nationally representative Czech sample and another large professionally gathered online sample close to national characteristics. Nevertheless, not having nationally representative data from a Slovak sample represents a certain limitation of this study. We accept that the numbers could slightly change if these would be included, as there are slight differences between Czechs and Slovaks in life expectancy and prevalence of some chronic illnesses [52]. Nevertheless, we do not suppose these potential differences changing the finding that consecrated persons in CZ and SK in our sample seem to have similar or worse general health compared to the major population. Another limitation of our study is related to the fact that the sample of CP is relatively small because of the general mistrust of CP towards surveys asking personal questions. We can also expect a certain selection bias in the sample, supposing the more active, more interested and healthier CP more likely to fill in the questionnaire. However, in case of this study, this selection bias seems rather to affirm the conclusion about the lower general health of CP. Implications Our findings suggest that there is a need for researchers and also for spiritual directors to focus more deeply on internal structures, daily routine, relationships, working habits and mental hygiene in religious communities. These issues should also be discussed directly in the religious communities and in the courses for religious formators. Furthermore, doctors, psychologists, counsellors and other helping professions should be informed more about the lifestyle of consecrated persons. Future research should be oriented to revealing positive and negative health effecting factors among CP, comparing CP both from local communities of one country and from different countries and cultural contexts, so that generally spread and culturally conditioned factors can be distinguished.

## 5. Conclusion

According to our findings, compared to the major society, persons living the consecrated life in the post-communist Czech Republic and Slovak Republic tend to have a similar or a slightly worse general health. The results differ from the US findings pointing at the positive health effects of spiritual experience and structured daily routine. Thus, this study shows the importance of more detailed research in the way of life of (not only) Czech and Slovak religious communities to determine factors that could be contributing to their negative health outcomes. Ethics statement The study design was approved by the Ethics Committee of the Olomouc University Social Health Institute (No. 2021/3).

## 6. Patents

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**Author Contributions:** For research articles with several authors, a short paragraph specifying their individual contributions must be provided. The following statements should be used “X.X. and Y.Y. conceive and designed the experiments; X.X. performed the experiments; X.X. and Y.Y. analyzed the data; W.W. contributed reagents/materials/analysis tools; Y.Y. wrote the paper.” Authorship must be limited to those who have contributed substantially to the work reported.

**Conflicts of Interest:** Declare conflicts of interest or state ‘The authors declare no conflict of interest.’ Authors must identify and declare any personal circumstances or interest that may be perceived as inappropriately influencing the representation or interpretation of reported research results. Any role of the funding sponsors in the design of the study; in the collection, analyses or interpretation of data in the writing of the manuscript, or in the decision to publish the results must be declared in this section. If there is no role, please state ‘The founding sponsors had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, an in the decision to publish the results’.

## Abbreviations

The following abbreviations are used in this manuscript:

MDPI	Multidisciplinary Digital Publishing Institute
DOAJ	Directory of open access journals
TLA	Three letter acronym
LD	linear dichroism
MSE	Mean Square Error

## Appendix A

### Appendix A.1

The appendix is an optional section that can contain details and data supplemental to the main text. For example, explanations of experimental details that would disrupt the flow of the main text, but nonetheless remain crucial to understanding and reproducing the research shown; figures of replicates for experiments of which representative data is shown in the main text can be added here if brief, or as Supplementary data. Mathematical proofs of results not central to the paper can be added as an appendix.

## Appendix B

All appendix sections must be cited in the main text. In the appendixes, Figures, Tables, etc. should be labeled starting with 'A', e.g., Figure A1, Figure A2, etc.

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**Sample Availability:** Study data and R code are available on Open Science Framework website [accessed date: 10 August 2021] (<https://osf.io/tv6m5/>).



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